1885MNRAS..45..208.

plans, to which was added the load of failing health, perhaps mental as well as bodily, until at last he found in death a release from that life so fraught with care and anxiety. This took place on January 28th, 1884.

He was elected an Associate of this Society on November 10, 1882.

R. C.

Marian Kowalski was born at Dobrzyn, in the province of Plozk, on August 15, 1821.

He was the son of a Polish nobleman, and received his early education at the Gymnasium of Plozk, removing subsequently to Warsaw, where he was trained for an engineer. The prospect of success was not encouraging, and he therefore, in 1841, entered himself as a student at the St. Petersburg University. Being ignorant of the Russian language, though proficient in German, French, and Latin, he had many difficulties to contend with; but by giving private lessons, he managed to keep himself and a younger brother at St. Petersburg.

In 1845 he left the university, after receiving the gold medal for his essay on "The Principles of Mechanics." The next year he passed his Master's examination, and took his degree upon an essay "On the Perturbations of Comets," which he wrote in Russian. This essay was unfortunately never printed.

For the greater part of the year 1846 Kowalski lived and worked at the Pulkowa Observatory.

In the spring of 1847, the Russian Geographical Society sent an expedition, under the command of Colonel Hofmann, to explore the little-known region north of the Ural Mountains. Young Kowalski, who had obtained a reputation among the savants of St. Petersburg for his astronomical and mathematical ability, was appointed astronomer to the expedition, for the purpose of determining the position and height of the Ural Mountains between Tscherdyn in the Government of Perm and the Arctic Sea, to serve as a basis for charting the neighbouring rivers Ob and Petschora. Great difficulties were met with—climatic and otherwise—which permanently affected his health.

The results of this expedition were published in the first volume of "Der Nördliche Ural und das Küstengebirge Pae-Choi, 1883." In this work we find the positions of 186 stations laid down for astronomical observations, and the heights of 72 points in the Northern Ural Mountains, determined partly from trigonometrical and partly from barometrical observations.

Kowalski was requested by the St. Petersburg Academy of Sciences to undertake some magnetic observations during this expedition; and he succeeded in determining the magnetic elements of five stations in the extreme north, where he happened to stay. He also made many meteorological observations.

From these magnetic observations he made a mathematical investigation on "The Opposite Working of Two Magnets and

1885MNRAS..45..208.

the Determination of the Horizontal Intensity of Terrestrial Magnetism," which was published in Russian in 1852.

In August 1850 Kowalski was appointed Assistant Astronomer at the University of Kasan. At this time he had already commenced his researches on the planet *Neptune*, which soon after brought his name into notoriety. In 1852 he published at Kasan a dissertation in Russian, "On the Motion of *Neptune*," and for this work and that on the Ural Expedition he was awarded the Demidowschen prize of the St. Petersburg Academy of Sciences. In this first paper on the motion of *Neptune* Kowalski gave the elements of the orbit derived from a limited number of observations. In 1855 he undertook a new investigation of the orbit, availing himself of all observations published up to 1853. This work, entitled "Recherches sur les Mouvements de *Neptune* suivies des Tables de cette Planète," was published at Kasan in 1855.

It consists essentially of two parts. In the first part the author investigates the corrections to be applied to the elements of the planet, taking into account the perturbations produced by *Jupiter*, *Saturn*, and *Uranus*. The materials which form the basis of this discussion consist of the early observation of the planet by Lalande in 1795, and all the accessible modern observations extending from 1846 to the close of 1853. The corrections applicable to Walker's elements of the planet published in 1847, from observations extending over a very small arc, are small.

The following are the definitive values of the elements obtained by Kowalski:—

Epoch 1850. Jan. 1, Greenwich Mean Noon.

	°	′	″
Mean Longitude...	334	36	29·78
Longitude of Perihelion ...	50	16	39·08 + 51·014t
Longitude of Ascending Node ...	130	7	45·30 + 39·615t
Inclination	1	47	0·89 − 0·346t
Mean Motion	7873·993		
Mean Distance	30·03386		
Eccentricity	0·0091736 + 0·0000000558t		

Professor Newcomb has shown, from a comparison of Kowalski's ephemeris with heliocentric longitudes derived from observations extending over a longer period, and using his perturbations, that the above elements require some small corrections.

The second part of Kowalski's memoir contains Tables of the planet founded on the corrected elements. In Table I. the author gives the heliocentric longitude and latitude and the logarithm of the radius vector for every thirty days throughout

1885MNRAS..45..208.

the period extending from 1846 to 1880, with columns of differences for interpolation.

Table II. contains the value of certain of the subsidiary quantities depending on the heliocentric rectangular co-ordinates of the planet, by means of which, in connection with the Sun's rectangular co-ordinates given in the *Nautical Almanac*, the geocentric right ascension, declination, and distance of the planet may be found for every thirty days from 1850·0 to 1880·0. Professor Newcomb has, however, called attention (*Monthly Notices*, vol. xxv. p. 45) to certain errors in these Tables which prevent them from accurately representing the motions of the planet.

In 1851 Kowalski went with Professor Popow to Berdjansk, on the Sea of Azov, to observe the total eclipse of the Sun on July 28, the results of which appear in the publications of the Kasan University for 1851. In this expedition they fixed the geographical position of ten of the principal towns on the Volga, the longitudes being determined by means of fourteen chronometers, and the latitudes with a transit instrument.

On the retirement of Professor Liapounov, in 1854, from the direction of Kasan Observatory, Kowalski was appointed his successor.

In 1856 he published a paper in Russian on eclipses, in which he gave his own methods for the complete calculation of eclipses and occultations.

In 1859 three important papers by Kowalski appeared in the "Recherches Astronomiques de l'Observatoire de Kasan." The first one, entitled "Sur les lois du mouvement propre des Etoiles du Catalogue de Bradley," was devoted to a discussion of the question whether the proper motions, and consequently the true motions, of Bradley's stars were subject to other laws than those governing the motion of the solar system in space, and what deductions could thence be made with regard to the structure of the stellar system, and the forces which rule it. The discussion is based entirely upon Mädler's proper motions of Bradley's stars. The result arrived at is that there exists a zone of minimum proper motion, which crosses the equator at 111° 43′ and 291° 43′ of Right Ascension. These points are 10° removed from the points of intersection of the Milky Way and the equator. The pole of this zone is situated in Right Ascension 201° 43′ and North Declination 21°, which is not far removed from the pole of the Milky Way, as determined by Sir John Herschel, viz. Right Ascension 191° 45′, Declination + 27°.

The remaining two papers, which constituted the only number of the "Recherches" ever published, were entitled "Sur le Calcul de l'Orbite elliptique ou parabolique d'après un grand nombre d'Observations," and "Développement de la fonction perturbatrice en série." A brief abstract of the last paper was published in vol. xxi. of the *Monthly Notices*.

After this period Kowalski does not appear to have devoted

1885MNRAS..45..208.

himself much to theoretical astronomy. During his later years he was occupied in the observations of circumpolar stars between +80° and the Pole, which sedulously engaged him until 1869, when he joined in the zone observations of the "Astronomische Gesellschaft," undertaking the zone between +75° and +80° Declination. The reduction of these observations was completed in 1883, and the printing, which was then begun, has already made considerable progress.

Kowalski was endued with great energy and power for work, but characterised by a modesty which made him shrink from publishing his works until he had severely criticised them.

From the interesting account of his life given in the *Vierteljahrsschrift* of the "Astronomische Gesellschaft" we learn that Kowalski has left much valuable scientific work which has not been published. The ability and conscientiousness displayed by him in all his researches are an assurance that astronomy would be greatly enriched by their publication.

An affection of the heart, from which he had suffered for some years, suddenly terminated his life on July 9, 1884.

He was a corresponding member of the St. Petersburg Academy of Sciences, and honorary member of the St. Petersburg University.

He was elected an Associate of this Society on November 13, 1863.

Johann Friedrich Julius Schmidt, Director of the Observatory at Athens, whose death was briefly announced in the last Annual Report, was born at Eutin, in Oldenburg, on October 25, 1825. At a very early age his friends soon perceived that he possessed a great inclination for astronomical pursuits, and scarcely had he entered his teens before he gave decided indications of those talents for quickness and acuteness in observing which have marked his scientific career throughout his life. What perhaps encouraged young Schmidt at this early period more than anything else in his enthusiastic taste for the observation of natural phenomena, and more especially for those relating to the physical features of the lunar disk, was the accidental circumstance that when only fourteen years old a copy of Schroeter's work on the Moon, *Selenotopographische Fragmente*, came by some means into his possession. The perusal of this work produced on his mind an intense desire to study on his own account, at some future time, the various peculiarities of the shadow-throwing hills and craters; and to this early influence we must attribute the origin of that life-long devotion which he afterwards gave to the subject of selenography. Fortunately for the young student at this commencement of his career, his father happened to have a small low-power telescope, and with this instrument, attached to a lamp-post, Schmidt made, in 1839, his first attempts at sketching some of the more prominent craters and their surroundings. For a year or two he had no